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In the Supreme Court
OF THE
United States

OCTOBER TERM, 1930

No. 4

CONCRETE MIXING & CONVEYING COMPANY
(a corporation),
Petitioner,

vs.

R. C. STORRIE & COMPANY
(a partnership),
Respondent.

DEFENDANT'S-RESPONDENT'S REPLY MEMORANDUM.

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This brief is filed by leave of Court first had and obtained.

At the conclusion of the first argument of this case before this Honorable Court in April, 1929, petitioner was granted leave to submit its "Reply Brief for Plaintiff-Petitioner" (28 pages).

Subsequently respondent and its counsel discovered that it contained a number of inexcusable misstate-

ments of evidence and facts which if allowed to go unchallenged, now that the case is resubmitted, may mislead the Court.

The erroneous statements of petitioner, to which exception is noted, occur on pages 17 and 18 of petitioner's said Reply Brief, and appear to be deliberate misrepresentations of what took place at the San Francisco tests of the Smith Gun, discussed at length in our opening brief (pages 125-132, inc.).

I.

Plaintiff-petitioner says (page 17, Reply Brief):

> "The material was forced only a short distance; it was a liquid mixture (which will not make concrete) and only a very small aggregate was used. (R. pp. 447-9 and 465.)"

Pages 447-9 refer to the identification by Mr. Wilkins of motion picture films taken by him, Exhibits 190-191-192, to which we invite the Court's attention.

Page 465 of the record, cited by petitioner, concerns the tests on both the Smith and Camniff machines.

As to the exact nature of the concrete which was actually blown through the **Smith** gun, the Court has only to look at the sample in evidence of the **Smith** mix, Exhibit 193, and compare it with the standard present day mix, shown by sample, **Exh. 194, such as was being used in the Sunset Tunnel with the Hackley gun** at that time and where the tests took place.

The "small aggregate" referred to was used with the **Canniff Grout Gun,** and **not** with the **Smith Concrete Gun.** (R. p. 465.)

The **Canniff** tests required "small aggregate" with concrete because the gun had only a 2-inch discharge pipe (the size of the pipe being the only limit to the size of the aggregate).*

The only reference to a concrete gun containing small size aggregate is in connection with the **Canniff Gun,** where Peterson says (R. p. 465):

> "Q. Then what did you do with the Canniff gun?
>
> A. With the Canniff gun—I should say with the Canniff gun we blew air through and then we blew an ordinary grout mixture with the Canniff gun with a grout mix of one part cement and two parts sand, and then we blew a concrete mix consisting of—with rock of the maximum size of one inch.
>
> Q. Did those tests satisfy you as to the practicability or otherwise of the Smith gun as a gun to shoot concrete?
>
> A. Yes, sir. I would say—I would use it on a large job. I would make a bigger gun but just the same type. The principle was satisfactory. It showed that it had the proper structure or proper general proportions and features to shoot concrete. That was what we were interested in doing."

The reference to Smith R. 465 (testimony of O. W. Peterson), is as follows:

---

*Down in Florida, with an 18-inch discharge pipe they conveyed rocks from 12 to 16 inches in diameter, and at one time conveyed a stone weighing 1300 pounds; and at another time an iron safe, 25 x 16 x 14 inches! (Our Opening Brief, Appendix, pp. 17-19.)

"A. We used first a grout of one part cement and two parts sand mixture. We then used the Smith formula mix of one part cement and one part sand and three parts rock; the parts being by weight and then we did three shifts (fifths) of the volume by water. That was the mix used as nearly as we could duplicate those conditions.

Q. Was a shot of water run through the machine first?

A. Well, we washed the machine first before we started, to be sure that there was no obstruction of any kind of that sort. As far as that goes, first of all we applied air through and then we applied water and then the grout and then the concrete mixture."

II.

Petitioner's next error is still more serious: Counsel say page 17 of said brief:

"(e) But respondents' witnesses, in order to make a seemingly plausible test went far beyond the Smith patent and used a tank 'two-thirds full of water' (Hackley, R. p. 439). This made the mixture, even if the tank were entirely filled, 66% water. This is not only an absurdity, but a fraud, and the statements of the witnesses that this was a concrete test or a test with the Smith mixture (Peterson, R. p. 465), are palpably deceptive."

"The foregoing demonstrates three things, to-wit:

* * * * * * *

2. That to support the utterly inadequate showing of the patent they felt obliged to resort to tests using a mixture having an absurd proportion of water."

That is strong language.

The record does not uphold it.

Neither Mr. Hackley nor any other witness said nor implied that the Smith mix as used at the tests, was two-thirds water. What Mr. Hackley did say concerning the Smith test is this, beginning R. 429:

> "A. They (photographs Exhibits 184 and 185) represent a machine built for the purpose of shooting concrete through a pipe. The discharge pipe is a **four-inch pipe** with a **four-inch valve** on it directly under this container. On top there is a two-inch and a quarter air connection. The air was let into the chamber under a 100-pound pressure. On the side was an opening for filling concrete or materials to be discharged from the pipe. **We first filled that container with water and turned on the air and opened the valve** at the bottom after plugging the inlets—the charging opened the valve at the bottom and the water was **discharged through the pipe.** * * *
>
> "I might say that the end of that discharge pipe was about thirty feet from the machine and at an elevation of about twenty feet above it. **After shooting the water out, we filled the container with concrete and shot that out in the same manner. We then used concrete**—mixed concrete with **rock up to an inch and a half in size** of two different consistencies or **two different mixtures and that** was discharged in a continuous stream in the same way. * * *
>
> "The first mixture by weight—one of cement and one of sand and three of rock. The second mixture, one of cement, two and a quarter of sand and about four and three-quarters of rock." (Boldface ours.)

Smith's machine is in evidence as defendant's Exhibit 186.

In short, what happened was that the tank was first filled two-thirds full of water **and the water then blown through the discharge pipe to lubricate the latter before the concrete was put in at all.** That is always done with every concrete machine, before starting operations.

The testimony of Mr. Hackley on cross-examination (R. 439) is consistent with the foregoing and does not support petitioner's serious (and obviously reckless and false) charge of fraud.*

Mr. Peterson's testimony, to which petitioners have the temerity to refer, entirely supports Mr. Hackley and the facts in connection with said tests. To quote Mr. Peterson, R. 466:

* * * * * * *

> "A. We have here one sample which is marked here 'Mix one, one, three, Smith patent mix.' I marked my initials on it, 'O. W. P. September 7, 1927.' There was no particular pains taken to preserve the character of the concrete. We just wanted to get a sample of the materials used. (Exhibit 193.)
>
> * * * * * * *
>
> "We have here sample No. 2, marked 'Rock mix, one, two and a quarter, four and three-quarters referring to the cement, sand and rock, 'O. W. P.

*Mr. Hackley on cross-examination (R. pp. 439-40) testified, in part as follows:

"Q. If I understand you, you had a tank here and how much water did you put in there?

A. About ⅔ full.

* * * * * * *

Q. Then you applied air under pressure to the top of that tank by an inch and a quarter pipe?

A. That is correct.

* * * * * * *

Q. Now, did the pressure acting on the surface of **that water** force that water down through that pipe in a solid stream, filling the discharge pipe?

A. **It mixed with the water as it went out."** (Boldface ours.)

> September 7, 1927.' These were samples obtained from materials which were put through the Smith Gun at the Sunset Tunnel on September 7th. (Exhibit 194.)"

The above testimony from the record completely refutes the loose interpretation placed upon it by petitioner.

These tests were not mere *ex parte* tests, but followed formal notice to petitioner and its numerous counsel as to time, place and purpose and inviting them to attend. It was a public demonstration of a thoroughly practical machine, in a practical way, under practical working conditions. The fact that petitioner's representatives did not choose to attend, grants them no license to misrepresent those tests nor to impugn the motives of the engineers and experts who conducted the tests, and whose testimony concerning the tests was heard and received by the trial Court. Their testimony was given full weight and is unimpeachable. (*Adamson v. Gilliland*, 242 U. S. 350.)

III.

The dangerous fallacies of petitioner's reasoning are further shown by the following statement on ill-fated page 17 of petitioner's reply brief:

> "(d) The Smith patent calls for a mixture which has three-fifths the bulk of solid materials added to it in water. This makes the mixture three-eighths water or 37½%. This is three times the normal amount of water, which is usually about 12% (one gallon to one cubic foot) accord-

> ing to common knowledge and all of the authorities, including Department of Agriculture, Good Roads Section. 300% of the normal amount of water will make nothing but a thin soup of the sand and cement, will entirely separate this soup from the mass of stone, and will destroy the concrete mixture."

The first two sentences state the facts correctly; but when petitioner's counsel speaks dehors the record they fall into serious error.

It is not true (even if it were material to the issues) that the Smith's mix calls for "three times the normal amount of water * * * according to common knowledge and all of the authorities including Department of Agriculture, Land Roads Section."

Inasmuch as petitioner has gone outside the record to mention an alleged authority (they cite no publication or bulletin) we are justified in asking the Court to take judicial notice of a recognized leading authority on the subject: "Basic Principles of Concrete Mixing," by Franklin R. McMillan, Director of Research, Portland Cement Association, 1929. We take the liberty of appending a photostat of page 76 from that work. As shown by that table, the quantity of water varies from 5½ gallons to 8¼ gallons per sack (1 cubic foot) of cement, which is equivalent, in the case of 8¼ gallons per cubic foot of cement, to **2½ gallons of water per cubic foot of mixed concrete**—not 1 gallon per cubic foot, as stated by petitioner.

Answering them in another way.

The Smith formula (see our opening brief, p. 120) calls for:

1 part cement
1 part sand
3 parts rock,

plus a quantity of water equal to 3/5 of the entire mass of commingled materials.

Thus assume with Smith, we mix a batch of:

100 lbs. cement
100 lbs. sand
300 lbs. rock,

or a total of 500 lbs. of commingled material or approximately 3.2 cubic feet.*

The 3.2 cubic feet of mixed materials require by the Smith formula, 3/5 of the volume of water; or 1.92 cubic feet of water, equivalent to 0.60 cubic feet of water per cubic foot of concrete; or 37½ lbs., or 14.3 gals. per cubic foot of cement.

This conforms to authority as seen by reference to the noted book of Prof. Baker, "A Treatise on Masonry Construction." 1908, page 112-1, where it is said:

> "156. The amount of water required to produce any particular plasticity varies so greatly with the proportion of ingredients, the kind and fineness of the cement, the dampness of the sand, the kind of aggregate, etc., that it is scarcely possible to give any valuable general data. The water varies from 10 to 40 pounds per cubic foot of concrete."

Not only is Smith's machine practical but his concrete mixture is eminently practical and up to date.

*The cement and sand fill the voids between the broken rocks so that the mass is denser and more compact than would be the case if there were 500 lbs. of rocks, the rock running about 33⅓ voids.

IV.

Petitioner at page 17 of said brief, in stressing the "velocity nozzle," misinterprets Smith:

> "(a) The Smith apparatus has no velocity nozzle," * * *

They overlook the important fact that in the Smith machine the air inlet on top of the apparatus is in vertical axial line with the vertical discharge outlet for the concrete. The consequence is that when the air is turned on, as was shown at the tests, the high pressure air under high velocity bores through the cement and does just what petitioner is claiming for the McMichael "velocity nozzle." McMichael had to show in his patent both air pressure on top and at the outlet, because of the U-trap 24 in the discharge pipe. McMichael never built a machine with such a U-trap because it would never have worked. (R. 422.)

Smith's single air jet performs both functions: i. e. Application of pressure on top of the concrete and acting locally to impel at high velocity the concrete through the outlet.

The concrete used in general practice with the Hackley gun is a wet concrete of sufficient fluid consistency that it can flow by gravity. (R. 424.)

Hackley uses no air on top of his concrete because if he did it would **blow out ahead of the charge,** as is readily seen by a mere inspection of the colored chart opposite page 3 of our opening brief.

Dated, San Francisco, California,
October 11, 1930.

Respectfully submitted,
CHAS. E. TOWNSEND,
Attorney for Defendant-Respondent.

TABLE VII.—RECOMMENDED WATER-CEMENT RATIOS FOR CONCRETE TO MEET DIFFERENT DEGREES OF EXPOSURE

These requirements are predicated on the use of concrete mixtures in which the cement meets the present standard specifications of the A. S. T. M. and to which an early curing is given that will be equivalent to that obtained when protected from the loss of moisture for at least 10 days at a temperature of 70 deg. F. Also that the concrete is of such consistency and is so placed that the space between the aggregate particles is completely filled with cement paste of the given water ratio.

Exposure \ Class of structure	Water-cement ratio, U. S. gal. per sack[1]		
	Reinforced piles, thin walls, light structural members.	Reinforced reservoirs, water tanks, pressure pipes, sewers, canal linings, dams of thin sections.	Heavy walls, piers, foundations, dams of heavy sections.
Extreme:			
1. In severe climates like in northern U. S., exposure to alternate wetting and drying, freezing and thawing, as at the water line in hydraulic structures.	5½	5½	6
2. Exposure to sea and strong sulphate waters in both severe and moderate climates.			
Severe:			
3. In severe climates like in northern U. S., exposure to rain and snow, and freezing and thawing, but not continuously in contact with water.	6	6	6¾
4. In moderate climates like southern U. S., exposure to alternate wetting and drying, as at water line in hydraulic structures.			
Moderate:			
5. In climates like southern U. S., exposure to ordinary weather, but not continuously in contact with water.	6¾	6	7½
6. Concrete completely submerged, but protected from freezing.			
Protected:			
7. Ordinary inclosed structural members; concrete below the ground not subject to action of corrosive groundwaters or freezing and thawing.	7½	6	8¼

[1] Free water or moisture carried by the aggregate must be included as part of the mixing